THE

AMERICAN JOURNAL

OF THE MEDICAL SCIENCES.

JULY, 1888.

MYXŒDEMA.

FOUR CASES, WITH TWO AUTOPSIES.

BY HENRY HUN, M.D.,
PROFESSOR OF DISEASES OF THE NERVOUS SYSTEM AND OF PSYCHOLOGICAL MEDICINE IN THE ALBANY MEDICAL COLLEGE.

WITH A REPORT OF THE MICROSCOPICAL EXAMINATION.

BY T. MITCHELL PRUDDEN, M.D.,
DIRECTOR OF THE LABORATORY OF THE ALUMNI ASSOCIATION OF THE COLLEGE OF PHYSICIANS AND SURGEONS, NEW YORK.

FIRST PAPER.

THE following four cases are typical examples of myxœdema, and their publication may, perhaps, contribute toward the solution of some of the doubtful points in the pathology of the disease:

CASE I.—*Aug. 16, 1884.* Mrs. M., æt. fifty-three; family history is very imperfect, but none of her relatives, so far as is known, ever had a disease similar to hers. Has had five children. They were all cross-births, and were all born dead except the second, who is now a girl of fifteen, and who is troubled with psoriasis. Has never had any severe sickness and has always been strong and healthy. Menstruation ceased four or five years ago, and since that time her face, body, and extremities have been very much bloated, and her eyesight has steadily failed. Her hair has fallen out a great deal, and she is frequently chilly, although at other times she has a very distressing burning and pricking sensation over the skin of the whole body. She suffers much from cold and frequently has cold sweats at night. During the past year she has been much troubled by vertigo, a roaring in her ears, insomnia, and occipital headache. Her speech is slow and difficult. Her mind is dull and confused and her memory poor. She is much troubled by dyspnœa, and when in bed she is obliged to lie on her left side in order to breathe easily. She feels no pain in her chest, but has a sense of oppression in the upper sternal region, and complains of a pain behind the top of the sternum in swallowing. She complains greatly of an uncomfortable burning sensation in the left hypochondrium. Her bowels are regular. Her urine is scanty and causes a burning pain on micturition. Her appetite is fair. Food, especially ale, causes much bloating of the abdomen. She takes from one to two tablespoonfuls of gin three times a day. Her face, hands, and legs appear as though œdematous. These parts, however, do not pit upon pressure but are firm and elastic. Her complexion is waxy. Her speech is slow, hoarse, and monotonous. Her mind is dull and she answers questions slowly. Abdomen is large and pendulous, otherwise abdominal and thoracic examination is negative. Her movements are sluggish, but there is no paralysis of motion or sensation. Urine is straw-colored and contains neither albumen nor sugar.

Nov. 14, 1886. I have not seen the patient during the past two years. Her appearance does not differ materially from what it was two years ago. The swollen appearance of the skin remains unchanged, the complexion is waxy, with a spot of livid congestion on each cheek, the eyelids are baggy, wrinkled, and translucent; there is a ridge above the inner half of each eyebrow, each naso-labial fold is continued up across the nose by a band of thickened skin just above it, the nose is broadened, the lips are smooth, thickened, and everted. The tongue is swollen and the mucous membrane of the mouth and pharynx pale. The mucous membrane covering the arytenoid cartilages and the false vocal cords is pale and swollen; the vocal cords are yellow, swollen, and do not completely meet in phonation, leaving a small oval between them at their middle. The skin of the hands and legs is similarly swollen and wrinkled and is scaly and of a slightly yellow tinge. The skin of the fingers is thickened and they cannot be completely extended. Plate I. (Figs. 1 and 2) is taken from photographs of this patient's face and hands. None of the swollen tissues pit except upon very deep and long-continued pressure. The hair of the scalp is thin; no hair in axillæ but some hair on the pubes. The nails are small, ridged, and strongly curved. The teeth are loose and brittle, portions of them breaking off frequently. Her hands, feet, and face, and especially her nose, are cold to the touch. She sometimes sweats a little, but usually her skin is dry and rough. There is no alteration in the secretion of her eyes or mouth, but her nose runs a great deal. Except for the pendulous abdomen, the thoracic and abdominal examination gives negative results. No absolute paralysis of motion or sensation, but she is weak and walking is difficult, and she sometimes falls, so that she is afraid to walk in the street. Urine contains a trace of albumen and a few hyaline and finely granular casts.

ELECTRICAL EXAMINATION.—Indifferent pole on the nape of the neck. (MacIntosh combined battery.)

Faradic current. All the nerves and muscles of face respond with tube fully in.

Galvanic current. Measured in milliampères (Gaiffe galvanometer).

	Left.	Right.
Facial nerve trunk.	KaS 6 AnS 8 AnO absent.	KaS 7¼ AnS 9½ AnO absent.
Frontal muscle.	KaS 3½ AnS 6 AnO 10.	KaS 3½ AnS 5½ AnO 10.

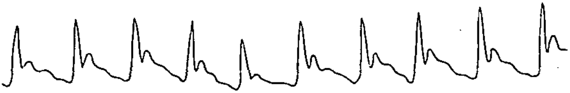
The other muscles of the face, although not tested so accurately, give similar results.

Examination of eyes by Dr. Merrill shows vision, right $\frac{20}{\text{xxx}}$, emmetropic; left $\frac{20}{\text{xx}}$, emmetropic. Range of accommodation good. All the tissues and media are normal except the optic nerves and retinæ; both nerves are pale, the right showing slight atrophy. The retinæ are slightly hazy throughout their entire extent. The fields of vision show a slight concentric limitation. ℞. Nitroglycerine gr. $\frac{1}{60}$ t. i. d.

Feb. 20, 1887. At first the nitroglycerine seemed to afford her some relief, but of late has produced no effect. She is gradually losing strength. Complains of pain in præcordia and of dragging pains in the lower part of the abdomen (which latter feeling was much relieved by an abdominal supporter), and that she can neither hear nor see well, although this is not apparent on actual examination. ℞. Syr. hypophos. comp. (Fellows), ʒj t. i. d.

March 25. Has slowly grown weaker, and ten days ago her strength gave out rather suddenly, and since then she has been confined to her bed and requires much assistance to sit up in bed. The skin is more swollen and is scaly and rough. There appears to be a slight amount of ascites. Her face is congested and looks as if she had fever. Her temperature, taken on several occasions, is 98.4° in the mouth, and 98.2° in the axilla; pulse 73. A sphygmographic tracing of the pulse is shown in Fig. 1. A week ago her respiration was irregular and exhibited long pauses, but of late it is natural. An examination of the blood shows 4,000,000 corpuscles in a cubic millimetre. Form of disks and ratio of red to white are not materially altered. Bowels are very constipated. Urine sp. gr. 1015 and contains a faint trace of albumen.

FIG. 1.



June 10. Patient remained in about the same condition throughout April, but in May she commenced to improve and has steadily gained strength, so that at the present time, although still weak, she can get out of bed without assistance and sits up most of the day.

Oct. 1. She continues to improve, walks about the room without trouble, and has once or twice been down stairs. She is unable to do any work. The skin of her hands is not as full and puffy as it was but more wrinkled, and is loose and freely movable on the subcutaneous tissues. The appearance of her face has not changed, but the hair on her scalp has grown again and is much thicker. Her voice continues rough and very hoarse, and she is very sluggish both in mind and body. No œdema of the feet but a decided ascites. At times during last summer she sweat a little, but her skin is for the most part dry. Continues to take a little gin daily.

January 22, 1888. This morning she suddenly became comatose, respiration slow and gasping, pulse of fair quality, deeply cyanotic. She lay in this condition, passing water and feces in bed for about twelve hours, and died to-day.

(The daughter of the patient has had, during the past year, a very severe attack of universal psoriasis, from which she made a complete recovery, a couple of months ago; but at present she is suffering from a relapse. Her appearance is myxœdematous.)

Autopsy twelve hours after death: Cheeks cyanotic, lips blue, breasts large, skin of legs rough and scaly. No hair in axillæ, scanty on pubes, slightly scanty on scalp. Skin generally is of white color, and on section shows nothing remarkable. Post-mortem rigidity slight. Scarcely any hypostatic congestion. Normal layer of fat under skin of scalp. Skull-cap of normal thickness, shape, and appearance, moderately adherent. Both surfaces of dura mater appear normal. Very large increase of subarachnoid fluid over surface of brain and at its base. Pia mater normal, except that all its arteries, even to the most minute, present numerous little yellow points due to thickening of their walls, so that the smaller arteries look like chains of alternately opaque and transparent beads. The larger veins of pia mater engorged with blood. The basilar artery moderately, the carotid arteries extremely, thickened and rigid. Ventricles of brain of normal size, except that the posterior horns on both sides are obliterated. Choroid plexus pale, and appears either cystic or gelatinous. Brain substance, perhaps, slightly œdematous, cortex seems normal. Puncta vasculosa of white matter and of ganglia at base well marked. In the superior anterior extremity of body of cerebellum, and extending laterally a little into each hemisphere, especially the left, is a small cavity filled with dark fluid blood. A slight hemorrhage is seen on the outer edge of the right hemisphere of the cerebellum, and scattered just beneath the surface of both hemispheres of the cerebellum, especially the left, are numerous small patches of dark blood, varying in size from a pea to the head of a pin. Choroid plexus of fourth ventricle presents the same appearance as that of the lateral ventricles. Sections through ganglia at base of brain are normal. A thick layer of pale gelatinous-looking fat under skin of back. Spinal cord appears normal on its surface.

A layer one and a half inches thick of pale gelatinous-looking fat over anterior surface of body. Pectoral muscles seem pale and flabby, and are infiltrated with fat. Pouch of fat in neck has, for the most part, disappeared. About half a gallon of clear yellow fluid in abdominal cavity. Position of viscera normal, except that the heart seems unusually large, and the intestines are unusually inflated with gas. About half a pint of clear yellow fluid in pericardial sac. Heart much dilated, and the walls of the left ventricle very greatly hypertrophied, measuring from three-quarters to one inch, the wall of right ventricle being only slightly thicker than normal. Auricles distended with dark blood, partly fluid and partly clotted; ventricles nearly empty. Tricuspid valve admits the tips of three fingers, and the mitral valve the tips of two fingers easily. Mitral valves very slightly thicker than normal. Aortic valves thickened, and present some calcareous deposits at base, but the valves are not sufficiently altered to interfere at all with their functional activity. Muscular tissue of the heart appears pale, but otherwise normal. Coronary arteries thickened and dilated. Arch of aorta generally atheromatous, but no calcareous deposits. Universal firm adhesion of right lung, and to a less degree of left. Hypostatic congestion of lower lobe of left lung, but not of right (she lay on her left side during the last twelve hours of life). Lungs otherwise healthy, and crepitate well.

Thyroid gland is smaller than normal, and presents several hard nodules. Liver of about normal size, and slightly granular. Spleen about normal size, capsule somewhat wrinkled, of firm consistence, and trabeculæ unusually distinct. Large deposit of fat in mesentery and omentum. Suprarenal capsules somewhat atrophied, cortices light in color, and presenting small yellow spots. Both kidneys moderately large, anæmic, cortex thickened and slightly opaque, cortical markings and glomeruli unusually distinct. Capsules not adherent. Uterus, ovaries, and appendages normal, except for some senile atrophy. Numerous small ecchymoses on wall of stomach. Urine drawn from bladder twelve hours after death showed albumen one-third per cent.

MICROSCOPICAL EXAMINATION.—The tissues and organs were received fresh and in good condition, and, for the most part, were hardened in Müller's fluid, followed by alcohol. The hardened tissues were imbedded in celloidin, so that the relations of the tissue elements were not disturbed in the operation of section-cutting, nor in the subsequent manipulations. The celloidin was allowed to remain in the sections, which were, in part, mounted in glycerine, in part in balsam; in the latter case the oil of origanum, which does not dissolve celloidin, was used in clearing. The stainings were, for the most part, with hematoxylin and eosin.[1] For the nervous system special methods of hardening and staining were used, which will be noted below.

Fresh skin of abdomen; chemical examination. A determination of the amount of mucin in a weighed quantity of the fresh skin and subcutaneous tissue of the abdomen was made in this case. This was done in the usual way by digestion in baryta water; precipitation with acetic acid; redissolving of the washed precipitate in lime water and reprecipitation, then washing and drying. A control determination was then made, by the same method at the same time, of the mucin in a like quantity of skin and subcutaneous tissue from the abdomen of a fairly well-nourished woman, who had been a moderate drinker, and died of phthisis pulmonalis. A comparison of the results of the two analyses showed that there was no more mucin in the same amount of skin in the myxœdema case than in the other.

Skin of back and abdomen. There was a considerable and irregular accumulation of superficial epidermis cells. The more superficial portions of the papillary layer of the corium appear normal. But just beneath the papillæ, in that zone of the corium in which the reticular and papillary layers merge into one another, the lymph vessels are dilated, and the interfibrillar spaces are widely open, so that the fibrillæ and the connective tissue cells stand out with unusual distinctness. The smaller bloodvessels of the corium are, in many places, surrounded by scattered collections of small spheroidal cells. The deeper layers of the corium appear normal. The sweat glands are normal.

Scalp. The hairs and sebaceous glands appear normal. Atrophic changes are not present. The distention of the inter-fibrillar spaces and the smaller lymph vessels of the corium just described in the skin, is even more pronounced in the scalp, as is the collection of small spheroidal cells along the smaller veins and capillaries.

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[1] For the preparation of the sections and most of the drawings in this and the following case I am indebted to Dr. Eugene Hodenpyl, Second Assistant in the Laboratory of the Alumni Association of the College of Physicians and Surgeons, New York.

Fat. The subcutaneous and other fat tissue show a moderate degree of atrophy, as indicated by the rounded contour, the pigmented protoplasm, and the evident nuclei of its cells.

The voluntary muscles, as represented by the biceps and the pectoralis major, appear normal.

The nervous system.[1] The *cortex, optic thalami,* and *corpora striata,* are normal. Portions subjected to Golgi's method, Weigert's method, and to nuclear stains, such as carmine, hematoxylin, and eosin, exhibit no abnormality in the arrangement and structural details of the ganglion cells and their processes, nor in the distribution and number of the fine nerve fibres in the gray matter. The perivascular and pericellular spaces are not larger than in control sections of normal cortex hardened in the same way, viz., Müller's fluid eight weeks, eighty per cent. of alcohol without washing, absolute alcohol. Sections from many places in the cortex, stained double and with acid fuchsin and by Golgi's silver and sublimate methods, show that the cortex is normal. There is no increase in the neuroglia. Many of the bloodvessels of the pia and cortex show in different degrees the lesions of a chronic obliterating inflammation.

In and between the *cerebellar folia* are a number of hemorrhages from one millimetre to one centimetre in diameter of comparatively recent origin. These are in part meningeal, in part involve the brain tissue, which is compressed and broken.

The *nerve tracts* and associated structures of the *isthmus, crura, pons,* and *medulla,* were examined in detail, in carmine and Weigert's hematoxylin stained specimens, and were found normal,

Spinal cord. The anterior and posterior fifth, seventh, and eighth cervical, the first, second, and twelfth dorsal, and the first and second lumbar nerve roots, with sections from corresponding portions of the cord, were fully examined (carmine, Weigert's, and Golgi's staining), and were found entirely normal. The dorsal posterior roots were examined with especial care on account of their relations to the sympathetic system.

Peripheral nerves. The trunk of the vagus, the upper and lower trunks of the brachial plexus on one side, and the radial and ulnar on one side, are normal. Carmine and double staining reveal no increase in the connective tissue, and in sections stained with Weigert's hematoxylin method the nerve fibres are intact and not diminished in number. The myelin in osmic acid stained portions of the radial and ulnar nerves is intact.

Sympathetic system. The semilunar ganglia (left about 4 millimetres by 18 millimetres in diameter, the right about 3 millimetres by 22 millimetres in diameter) stained by Ranvier's gold method, by hematoxylin, eosin, and carmine stains on both sides, and the great splanchnic on the right side near its junction with the semilunar ganglia, are normal. The middle cervical ganglion (thyroid ganglion) (three by five millimetres in diameter) and the inferior cervical ganglia (nine millimetres in both diameters), are normal. The ganglion cells are not shrunken, a few are pigmented, and the connective tissue is not increased. Several of the numerous branches of both of these ganglia were examined, and are normal. A portion of the trunk of the sympathetic above the thyroid ganglion is normal.

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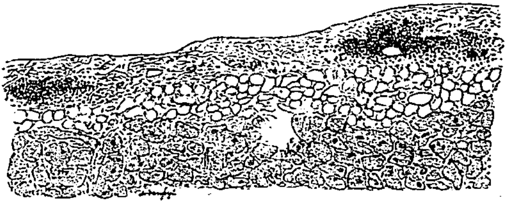
[1] For the preparation of the sections, and for the examination and report on the nervous system, in this and in the following case, I am indebted to Dr. Ira T. Van Gieson, First Assistant in the Laboratory of the Alumni Association, College of Physicians and Surgeons, New York.

The heart. The muscles apppear normal. The coronary arteries and their branches show a moderate degree of chronic endarteritis. Just beneath the surface of the visceral pericardium are numerous scattered collections of small spheroidal cells grouped around dilated bloodvessels (see Fig. 2); these cells lie among the fibres of the pericardial connective tissue, and appear to be the result of local emigration; these collections of cells are widely distributed about the pericardium.

FIG. 2.



Section of external layer of heart muscle, with pericardium. Showing collections of small spheroidal cells about the bloodvessels.

The bloodvessels throughout the body, so far as examined, were the seat of endarteritis, with more or less atheromatous degeneration. This was well marked in the carotids, the thyroid, and the cerebral arteries.

Lungs. The lower lobe of the left lung shows distention of the vessels with blood, and an accumulation of red blood cells in the air vesicles. A few of the branches of the pulmonary artery are the seat of a moderate degree of amyloid degeneration.

Stomach. The small veins about the above-mentioned ecchymotic spots of the mucous membrane of the stomach, in both the mucosa and submucosa, are distended and plugged with red blood cells, leucocytes, and masses of blood plaques; and the regions of the mucosa from which they come show necrosis and superficial disintegration of both the follicles and interfollicular tissue. Minute collections of small spheroidal cells are found here and there in the subserous layers of the stomach, around the smaller veins and capillaries, and blocking up the lymph vessels. Many of the smaller arteries of the submucosa show a considerable degree of amyloid degeneration of the media, while others show a swelling and proliferation of the endothelium.

Spleen. This is apparently normal, save for considerable amyloid degeneration of the smaller arteries.

Liver. There is a slight increase in the interstitial tissue and a moderate dilatation of the capillaries about the central veins.

The pancreas is apparently normal.

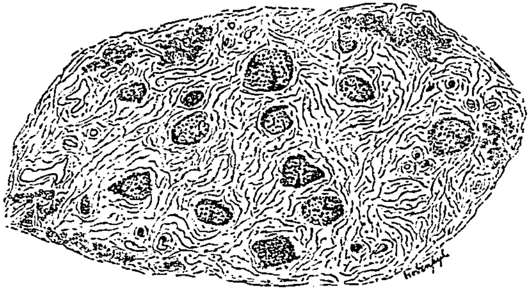
Kidneys. The convoluted tubules are in places moderately dilated with compressed epithelium, but they are for the most part normal in size, and their epithelium normal or swollen and unusually granular. The lumina of the tubules contain, in many parts of the cortex, irregular granular masses, hyaline droplets, and disintegrated epithelium. The interstitial connective tissue is increased in amount, especially in streaks and patches about the glomeruli and along the line of the interlobular arteries. The smaller bloodvessels, particularly of the glomerular tufts, are distended with blood. Many of the smaller arteries show a moderate amount of amyloid degeneration.

The supra-renal capsules. Scattered here and there throughout the interstitial tissue of the gland and grouped around the bloodvessels are tiny dense collections of small spheroidal cells, resembling leucocytes. A few circumscribed areas of fatty degeneration of the epithelium are present. In most of these the degeneration is so excessive that the epithelial cell spaces are widely distended and the lumina of the neighboring bloodvessels obliterated. Some of the smaller arteries are the seat of amyloid degeneration.

The thyroid gland. The thyroid gland is symmetrical in shape, but very small and nodular. The lobes measure from one-third to one-half an inch in diameter, and the entire gland weighs 112 grains. A small cyst in one lobe, apparently formed from a group of dilated vesicles, contains fatty cells, cholestearine crystals, and free fat droplets. It does not seem necessary to describe in detail the minute lesions of the thyroid in this case, since they were identical in character with those which will be fully described in the case of Mrs. B. (Case II.), which was first examined.

A large proportion of the atrophied gland was made up of dense connective tissue, so that a transverse section across the lobes had the general appearance represented in Fig. 3.

FIG. 3.



Transverse section through the largest part of one of the lateral lobes of the thyroid gland—about six times the natural size.

There was the same accumulation of small spheroidal cells and of lymphatic tissue about the remains of the gland lobules, as will be described in the next case, but in general the lymphatic tissue had penetrated more deeply into the lobules. So marked was this change that in some parts the entire atrophied lobule was represented by a rounded mass of lymphatic tissue, from one-half to one millimetre in diameter, in which, buried among the small spheroidal cells in the reticular tissue, were a few small irregular clusters of granular disintegrating epithelium, the sole representatives of the glandular structures.

The following case occurred in the practice of Dr. A. McLane Hamilton, of New York, who requested me to attend the case in the intervals between his visits, and who has very generously allowed me to publish the results of the examinations which I made of the patient during her life and after her death:

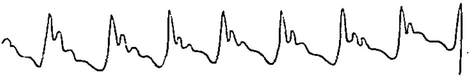
CASE II.—*Sept. 17, 1886.* Mrs. B., aged fifty-four. Her family history is good, as far as is known, down to the present generation. One of her brothers died of disease of the brain, one sister had convulsions in infancy and since that time has been weak-minded, and her other brothers and sisters are of a decidedly nervous temperament. The patient had a severe attack of typhoid fever when twenty years old, but since that time has been healthy. She is the mother of five children, has had no miscarriages, and passed the climacteric four or five years ago without any noteworthy incident. Very soon after the climacteric her face commenced to be bloated and has continued to grow gradually more and more bloated up to the present time. Since the climacteric also she has become less and less active and more and more nervous and hysterical. During the past six or eight months she has exhibited slight mental impairment.

At the present time she is constantly in a condition of great nervous excitement, is continually walking about, will not remain seated, and feels inclined to scream. She complains of much distress in her head, cannot bear any loud noises, and is afraid of becoming insane. She has but little appetite and complains of much distress in the epigastrium, apparently due to flatulence, is slightly constipated, and her urine is abundant. She scarcely perspires at all; her mouth is dry and pasty; she has no tears, and it distresses her greatly that she cannot weep over the death of her mother which took place recently; her skin, especially her nose, is constantly cold, and her hair is thin.

Patient is rather fleshy; her complexion is waxy, with a spot of livid congestion on each cheek. The face is swollen; the eyelids are baggy, wrinkled, and translucent; there is a ridge above the inner portion of each eyebrow; the naso-labial fold is continued up over the nose by a thick ridge of tissue just above it; the alæ and tip of the nose are swollen, the lips are swollen and smooth and the lower one everted. The tongue is swollen, and the whole mucous membrane of the mouth and pharynx is anæmic and covered with a dry, whitish mucus which feels so unpleasant that she is constantly rinsing her mouth with water.

The skin of the body generally is thickened, does not pit on pressure, scaly, has a slightly yellowish hue, and is cold to the touch, especially the nose, hands, and feet. At the outer edge of the right eyebrow there is a patch of chloasma, and on the scalp are large yellow patches of scaly cuticle, and the skin of the axillæ is of a dark brown almost black color, otherwise there is no pigmentation except the faint yellow tinge of the entire skin. The hair on the scalp is rather thin; there is no hair in the axillæ; she has a very few hairs on the chin, and the fine hair on the body is well developed. The nails are well formed, except that some of them are grooved longitudinally and they are very brittle. No thyroid gland can be felt. There is no abnormal compressibility nor mobility of the trachea. There is a large fatty tumor in the supra-clavicular fossa on each side of neck. Thoracic examination gives negative results. Abdominal walls are greatly distended, relaxed, and pendulous. The liver is dislocated downward and is abnormally movable. Urine contains neither albumen nor sugar. Sensibility, reflexes, smell, taste, hearing and sight are normal. All movements are sluggish and a little weak. Speech is slow. When she speaks in a shrill key her voice is fairly clear, but when in a deeper tone her voice is rough and hoarse. Pulse is 68, small. A sphygmographic tracing is shown in Fig. 4. Examination of the blood shows 3,806,000 corpuscles in a cubic millimetre. The appearance of the corpuscles and the ratio of the red to the white are not materially altered.

FIG. 4.



ELECTRICAL EXAMINATION.—Indifferent electrode on nape of neck. *Faradic current.* MacIntosh combined battery.

	Right.	Left.
Facial nerve trunk in front of ear.	All muscles respond with the tube fully in.	All muscles respond with tube withdrawn ½ inch, and all but the muscles supplied by the inferior branch respond with tube fully in.
Orbicularis palpebrarum muscle.	Responds with tube fully in.	Responds with tube fully in, and from this motor point of the orbicularis the frontal muscle also contracts with tube fully in.
Frontal muscle.	Responds with tube fully in.	Responds with tube withdrawn ½ inch.
Zygomatic muscle.	Responds with tube fully in.	Responds with tube withdrawn ⅞ inch.

In general, the muscles of the right side not only respond to weaker currents, but are also quicker in their contraction, the muscles of the left side acting rather sluggishly and continuing for some time in a state of contraction, as is also the case in a less degree with those of the right side. This sluggish contraction of the muscles disappears when strong currents are used, and is more noticeable with the faradic than with the galvanic current. There is no apparent reason why the frontal muscle should contract more readily from the motor point of the orbicularis palpebrarum muscle than from its own motor point.

Galvanic current. Measured in milliampères (Gaiffe galvanometer).

	Right.	Left.
Facial nerve trunk.	KaS 3¼ AnS 10 AnO absent.	KaS 5½ AnS 9 AnO absent.
Orbic. palpeb. muscle.	KaS 2 AnS 5¼ AnO 6½.	KaS 2½ AnS 6½ AnO 8½.
Frontal muscle.	KaS 2 AnS 3½ AnO absent.	KaS 5 AnS 6 AnO absent.
Zygomatic muscle.	KaS 8 AnS 9½ AnO absent.	KaS 9 AnS 11 AnO absent.

In 1877, and again in 1881, Dr. Merrill examined the patient and found vision $\frac{20}{\text{XX}}$ in each eye. An examination by Dr. Merrill at the present time shows vision $\frac{20}{\text{XL}}$ in each eye, not improved by glasses.

Each eye shows a manifest hypermetropia of $\frac{1}{36}$. Tension of the globes normal, range of accommodation good, and the action of the external ocular muscles perfect. Color perception perfect. Fields of vision show a marked symmetrical limitation (see Fig. 5). The ophthalmoscopic examination shows the media to be clear, a slight atrophy of the optic nerves, and some œdema of both retinæ which is uniformly diffused over the whole retina.

FIG. 5.

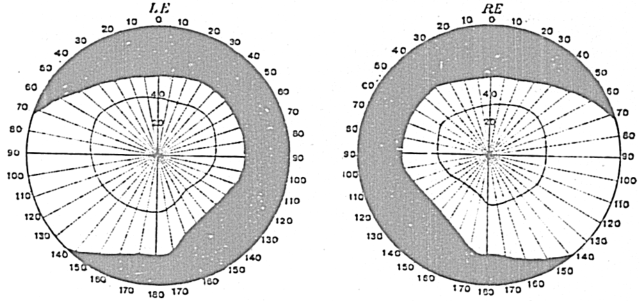


Diagram of the field of vision.

From Sept. 14th to 23d numerous temperature observations were taken, which showed a lower temperature on the left side of from two to four-tenths of a degree; the axillary temperature being from one-half to one degree below the normal.

℞. Elixir ferri lact. ʒj t. i. d. ℞. Nitroglycerine gr. $\frac{1}{50}$th four times a day, to be increased in a few days to gr. $\frac{1}{25}$th t. i. d. Patient was also given, as occasion required, a sedative mixture containing bromide of potassium and cannabis indica.

Oct. 14. In many respects there is decided improvement. She is less nervous and restless, is less disturbed by noises, has more control over herself, is willing to see a few friends, and goes out driving. Her mouth and tongue are less dry, her pulse is fuller, her skin is warmer than it was, her temperature normal, and she occasionally perspires a little. Her mind is weaker and more childish. Her walk is weak and awkward and at times she would fall were it not for her nurses.

20th. Since the last record she has refused to take any medicine. Has had no hallucinations, but now for the first time exhibits delusions. She maintains that her eyes have no longer their normal appearance, that she cannot really see and is afraid to go to sleep because she is convinced that she will awake entirely blind. She complains of much backache.

22d. At noon to-day a decided change took place. The expression of her face greatly altered and she has the appearance of a bewildered, insane person. She exhibits many delusions; she says that she cannot see, that her throat is rapidly closing so that she cannot swallow, and that she cannot talk; she says a few words perfectly distinctly and then repeats such sounds as ga, ga, ga, ka, ka, ka, gee, gee, gee, au, au, au, hi-i-i-, etc. She complains of pain in the right hypochondrium and constantly keeps her body strongly bent over to the right side. She is extremely wild and excited and constantly in motion.

Nov. 8. She still refuses to take any medicine and for the past two days has refused food, although after much persuasion she took a little to day. She continued to be very excited and delirious till the first of this month, when she passed into a condition of stupor or bewilderment. She was very dull and her mind acted very slowly; more than a minute elapsed after a question was asked before she answered it. This quiet, dull condition only continued a few days, and of late she has been steadily growing more and more excited, and yesterday and to-day she has been very insane. She is sure that the dead bodies of her children are lying up-stairs because she can smell them. Everything about her she thinks is poisoned and she is afraid either to eat or drink.

18th. Since the last record she has taken no nourishment whatever until to-day when she took a little fruit. Her abstinence from food, which started from the delusion that everything was poisoned, has been continued by the delusion, which has been very prominent during the past week, that she is very poor and has no right to eat food which she cannot pay for. On account of this delusion of poverty she is constantly trying to pack up a few of her things and leave the house. The skin seems colder to the touch, but the temperature is 98.8° in both axillæ and 100° in the rectum.

Dec. 8. The swelling of her face and hands has seemed to vary a little during her sickness from time to time, and is now rather less than it was. She no longer complains of any dryness of the mouth nor does it seem to be dry, and there is often a free discharge of water from the mouth, but no tears. She perspires at times, and once her body was covered with sudamina. During the past month she has been entirely oblivious of the calls of nature; she does not soil herself, but never passes either urine or feces unless the nurses sit her on the closet and tell her to do so.

Jan. 21, 1887. During the past month the patient has continued to be much confused. She has slept but little and has been very restless, and much of the time violent and delirious. Her pulse and temperature have continued normal. During the past week she has had much diarrhœa and has become weak and emaciated, and the masses of fat on each side of the neck just above the clavicle have disappeared. During the past month she has been given two or three nutritive enemata every day when the condition of the bowels would allow of it. Yesterday she was so weak that she remained in bed all day; last night she became comatose, and this morning she died.

Autopsy, seven hours after death. Post-mortem rigidity marked. Slight hypostatic congestion. Moderate amount of subcutaneous fat of dark yellow color. Very little blood in the tissues and organs. Each lobe of the thyroid gland was a flattened ovoid body measuring one, three-quarters, and half an inch in its three dimensions. The fatty tumors had disappeared from the side of the neck. The right lung was free from adhesions, the left being strongly adherent posteriorly and to the diaphragm. Slight œdema of inferior lobe of each lung, the upper lobe being anæmic. Pericardium empty, right ventricle flabby, left firmly contracted and slightly hypertrophied, considerable sub-pericardial fat which has a gelatinous appearance. Surface of liver somewhat granular, sections of the organ appear normal, gall-bladder full of dark-green bile. Spleen is firmly adherent to diaphragm, its capsule is thickened, and the whole organ is contracted and dense, measuring four and two and a half inches. The suprarenal capsules are atrophied. The kidneys show well-marked lobulation, their capsules are rather adherent, their surface on section appears normal. The ovaries are white and atrophied. There are several small fibroids in the uterine wall. The mesentery contains a small amount of yellow fat, no mesenteric glands are visible. The intestines contain several large lumps of hardened feces. The scalp (except for the thinness of the hair) and the calvarium appear normal. Both the small and the large veins of the pia mater are distended with blood. There is a large amount of subarachnoid fluid over the surface of the brain, and there is a general narrowing of the convolutions which is especially marked at the posterior part of the superior parietal lobule on the right side. Sections through the hemispheres and the ganglia at the base reveal nothing abnormal except a general œdema. The ventricles are of normal size and appearance.

MICROSCOPICAL EXAMINATION.—The portions of tissues and organs received had been hardened in Müller's fluid and alcohol, and were well preserved. Blocks of the various parts were embedded in celloidin, and the sections stained with hematoxylin and eosin.

Nervous system. The *cortex of the brain* and the *cerebellar folia* are normal. With carmine, hematoxylin, and eosin double staining the perivascular and pericellular spaces are not enlarged, and the ganglion cells present their proper topography and structural details. With Weigert's method the fine fibres in the gray matter are not diminished in number. Neuroglia not perceptibly increased. The isthmus and spinal cord are normal. A portion about one-half millimetre in diameter, of the nucleus cuneus is detached and lies external and posterior to the lateral angle of the nucleus.

Skin and fat. In the skin of the abdomen and thigh the layer of superficial epidermic cells is thick and irregular, the cells being in part packed in dense layers, in part lying in loose, more or less voluminous shreds.

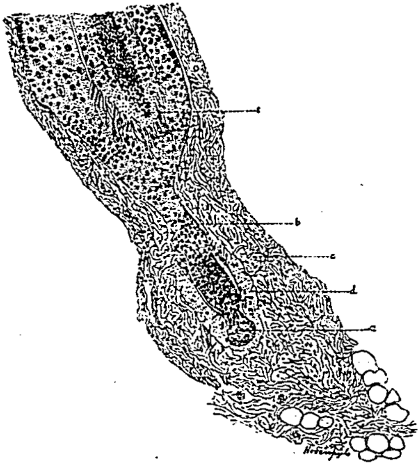
The delicate fibrillated fibres of the papillary and subpapillary layers of the corium are unusually distinct, and appear as if they were or had been crowded apart by some homogeneous material the nature of which I am unable to determine. Thus while the outer layers of the corium appear relatively thicker, they are less dense than normal, and there is no apparent increase either of the fibrillated or the elastic fibres. The deeper layers of the corium appear normal. There are small, irregular, and scattered collections of small spheroidal cells, which have the appearance of leucocytes, about the smaller bloodvessels of the more superficial layers of the corium. The bloodvessels contain about the usual amount of blood, do not appear compressed, and are apparently normal. The sweat glands are normal.

Fat. The subcutaneous fat of the abdomen and thigh differs from normal adult fat in that the individual fat cells are in places unusually distinctly outlined, and present more or less rounded contours, while distinct intercellular spaces are abundant. Large, distinct nuclei and a zone of protoplasm are frequently present in the fat cells; while about the nuclei, in many cells, is a small accumulation of yellow granular pigment. The fat tissue has thus in general more the characters of atrophic or embryonic fat than that of well-nourished individuals. This condition of the fat is, however, not uniformly present, but appears only in scattered areas.

The scalp. The superficial layer of the epidermis is thick and irregular. While a portion of the hairs appear normal, a large part of them present various phases of atrophy.

From some of the follicles the hairs are absent, and the follicle is represented by an irregular elongated mass of cells. In others the bulb is atrophied, and is merged with the papilla into a dense irregular knot containing but little pigment (Fig. 6, *a*.) Passing upward from this is a solid mass of cells, irregularly packed together, replacing both the shaft and the root sheaths (Fig. 6, *b*). The dermic coat of the follicle, on the other hand, is thickened and unusually dense in texture, and the inner layer of that portion just above the bulb is converted into an irregularly lobulated hyaline mass containing few nuclei (Fig. 6, *d*). Above this the hair shaft takes its origin in a large bulging mass of epithelial cells, representing the cells of the outer root sheath, but is without a papilla. These may be called *false hair bulbs* (Fig. 6, *e*). The outer root-sheaths above the false bulbs are frequently rough and irregular in their contours.

FIG. 6.



Atrophied hair follicle from scalp. *a*, atrophied bulb and papilla; *b*, deep portion of follicle: *c*, thickened dermic coat; *d*, hyaline degeneration in dermic coat; *e*, false bulb from which the hair grows, without a papilla.

The *sebaceous glands* are in general much atrophied, and lie beside the hair follicles in the form of irregular, narrow, cylindrical bags, containing but few—not infrequently a single row—of the characteristic secretory cells, or in some cases none at all. Not infrequently slender, accessory hairs originating near the mouths of the sebaceous glands, in small false bulbs, issue obliquely from the atrophied follicles. There are collections of small spheroidal cells about the smaller bloodvessels of the corium, but the bloodvessels appear otherwise normal. We have thus in the scalp the lesions of simple alopecia.

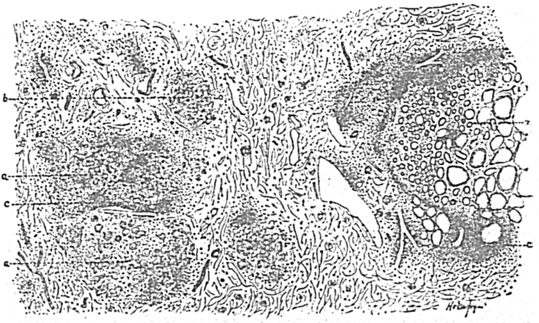
The heart shows a moderate amount of dense connective tissue in patches beneath the surfaces of the papillary muscles of the left ventricle and extending in streaks into the muscle tissue. The heart is otherwise normal.

The *subpericardial fat* presents in much more marked degree than the subcutaneous fat, the lesions of atrophy of the fat cells, so that they exhibit in their rounded contours, in their large, well-formed nuclei and protoplasmic disks, and in their wide, intercellular spaces, a most marked embryonic type.

The spleen shows a moderate thickening of the intima of the smaller arteries and considerable hyperplasia of the reticular stroma of the pulp. The glomeruli are normal.

The liver shows an irregular thickening of the capsule and a considerable increase in the interlobular connective tissue, which is richly supplied with small spheroidal and fusiform cells. There is a moderate degree of fatty infiltration; there is no increase in the lymphatic nodules of the liver.

FIG. 7.

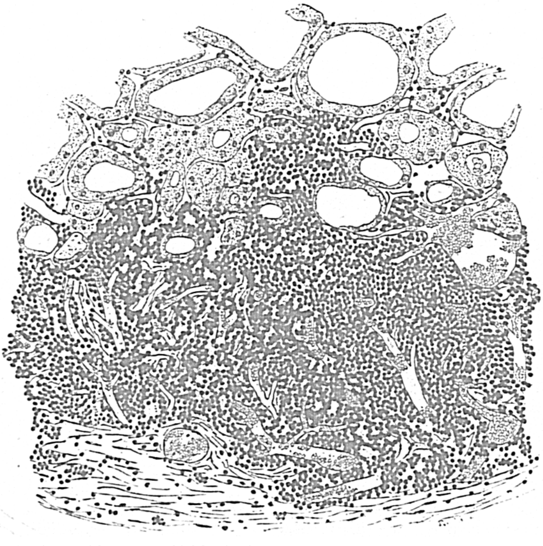


Section of atrophied thyroid gland. Low power. *a* and *b*, atrophied lobules; *c*, new-formed lymphatic tissue in the periphery of lobules.

The kidneys show a considerable increase in the interstitial tissue of the cortex, especially about the glomeruli and along the lines of the interlobular arteries; this new connective tissue is, for the most part, richly cellular. The tufts of the glomeruli are frequently replaced by dense knobs of connective tissue. There is, corresponding to the increased amount of interstitial tissue, atrophy of the uriniferous tubules. Many of the convoluted tubules are dilated, their epithelium flattened or disintegrating at the free borders, or absent. Hyaline casts are present in moderate number in the straight tubules.

The thyroid gland. The capsule of the very small, hard, and nodular thyroid gland is denser in texture and thicker than normal, and contains numerous small arteries and dilated thin-walled veins, and capillaries which are in places greatly distended and irregularly pouched with blood. The thickened capsule merges on the inside imperceptibly into the dense interstitial tissue of the gland. The appearance of the lobes of the gland itself, as seen in transverse sections, differs in marked degree from the normal, not only on account of its greatly diminished size, but because of the greatly increased amount of interstitial tissue in proportion to the parenchyma (Fig. 7). The interstitial connective tissue occupies from one-half to two-thirds of the section area in all parts of the gland; this interstitial tissue is, for the most part, dense and fibrillar, and is irregularly distributed; it contains numerous thin-walled bloodvessels, which are in places distended and pouched with blood. Fusiform and small spheroidal cells are in general scattered in moderate numbers among its fibres. In some places, on the contrary, the connective tissue about the bloodvessels is densely infiltrated with small spheroidal cells, having the appearance of leucocytes.

Fig. 8

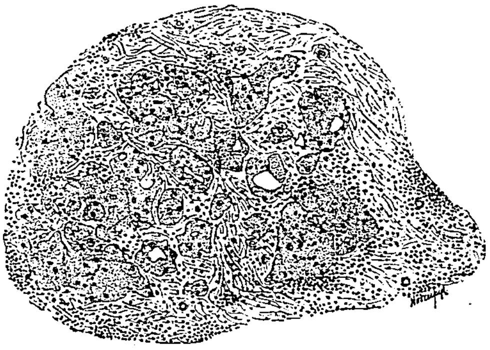


Section from periphery of atrophied lobule of thyroid gland. Showing irregularly formed gland vesicles, surrounded by lymphatic tissue.

But it is the parenchyma of the gland which presents the most marked and striking alteration. Scattered here and there throughout the atrophied gland are little islets of gland tissue (Fig. 7, *a*), the largest from three to four millimetres in diameter, the smallest scarcely visible to the naked eye, composed of a congeries of larger and smaller rounded or irregular-shaped vesicles, which are either regularly lined with moderately granular, flattened, or cuboidal epithelium, or completely or nearly completely filled with a multinucleated granular cell mass or a clump of irregular shaped, more or less distinctly outlined cells (Fig. 8). The vesicles or cell cavities possess a very thin membrana propria, and are surrounded by a regular capillary network. These masses of vesicles apparently represent the lobules of the thyroid, and the larger vesicles are usually in the centre, the smaller in the periphery of the lobules. A few of the larger vesicles contain colloid material.

Then there are somewhat similar lobules of gland tissue, so small as to be generally invisible to the naked eye, whose vesicles throughout are very small, and for the most part completely filled with irregular granular cells (Fig. 9). Two or three of these islets of gland tissue may lie side by side, but they lie, for the most part, singly, and separated from each other by broad bands of interstitial tissue.

FIG. 9.



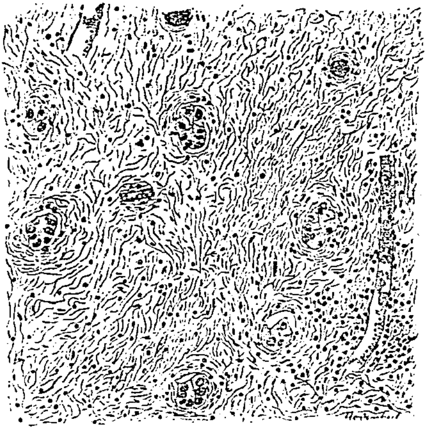
Very much atrophied lobule of thyroid gland. Showing masses of granular epithelium in place of the normal vesicles.

Finally, scattered everywhere in the interstitial tissue, are large granular cells or cell masses (Fig. 10) which have the same morphological characters as the epithelium above described in the larger and smaller lobules, but lying singly.

In the periphery of most of the islets of gland tissue, is a great accumulation of small spheroidal cells, lying in the interspaces of a rich vascular network (Fig. 7, *c*, and Fig. 8).

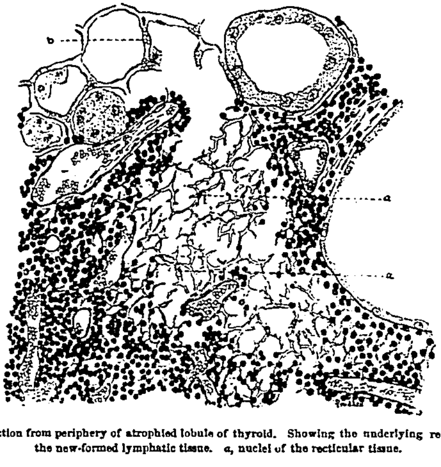
This peripheral accumulation of cells is sometimes in the form of a dense, sharp-edged, narrow band; but is most frequently somewhat

FIG. 10.



Interstitial tissue of atrophied thyroid. Showing scattered epithelial cell masses.

FIG. 11.



Shaken section from periphery of atrophied lobule of thyroid. Showing the underlying reticulum of the new-formed lymphatic tissue. *a*, nuclei of the recticular tissue.

diffuse at the edges and extends inward among the gland vesicles in wedge-shaped masses or branching streaks. Where this small cell accumulation is moderate in amount, the cells lie around the bloodvessels between the fibrillated fibres of the interstitial tissue, or along the capillaries between the gland vesicles, so that they appear as if due to an emigration of leucocytes. But where the accumulation is voluminous, an examination of sections from which the small spheroidal cells have been removed by pencilling or shaking under water, reveals a most marked and highly developed genuine reticular tissue quite similar, save for its distribution, to that which forms the reticular framework of the lymphatic nodes (Fig. 11). This reticulum has its distinct nodal points of intersection upon which lie flattened cells with moderately large, round, or ovoidal nuclei (Fig. 11, *a*). This reticular tissue merges, on the one hand, into the fibrous interstitial tissue, and, on the other, into the small amount of tissue accompanying the capillaries about the gland vesicles.

In a few places small masses of spheroidal cells lying in the meshes of a tiny mass of reticular tissue were found, apart from the glandular structures. These resemble the small masses of lymphatic tissue which, as shown by the researches of J. Arnold, are normally present in various organs—liver, lungs, kidney, etc.

We have thus in the thyroid, in addition to a relatively large amount of interstitial connective tissue and an excessive atrophy of the parenchyma, an actual new formation in considerable amount of lymphatic tissue, both in isolated nodules and around the atrophied lobules.

For the opportunity of examining and reporting the following case, I am indebted to Dr. Franklin Townsend, of Albany, whose patient he is:

CASE III.—*January 15, 1887.* Mr. Y., æt. thirty-six, unmarried. His father is healthy, but lethargic. The mother and the three children all have a more or less myxœdematous appearance. The patient is the oldest of the three children. He probably had syphilis about ten years ago. He was thoroughly treated for it, and, finally, went to the Hot Springs of Arkansas, from which he returned, in 1878, in first-rate health. Between 1880 and 1884, he made several trips to New Mexico, being interested in some mines, and during his last visit there he thinks he contracted his present sickness. Before the disease made its appearance he was in the habit of smoking to excess, and drank from twelve to fifteen glasses of beer daily. He came to Dr. Townsend in August, 1884, for treatment on account of a scaly fissured eczema behind his ears, and at that time he presented the following symptoms: His face, lips, legs, and ankles were swollen and pitted somewhat on deep pressure, his eyelids were baggy and wrinkled, there was a bridge of thickened tissue across the nose, his tongue was so swollen that he talked with great difficulty, and his voice was rough and hoarse. The skin of his body was white except for a decided yellow tinge under the nails of the fingers and toes, and a patch of chloasma on the right temple and the right side of the face. His skin was dry and itched somewhat, the epidermis peeled off in great quantities, and his hair was brittle and broke off in large quantities, about one-quarter of an inch above the scalp. His actions were sluggish, and he was so weak that he twice fell in the street, once when he was trying to catch a horse-car. His mind was sluggish, it took him a long time to answer questions and his memory was poor.

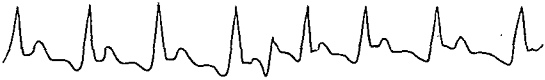
A careful examination of the thorax and abdomen revealed nothing abnormal, except a decided enlargement of the liver. Urine was normal. Pulse about 60.

He was given iodide of potassium, grs. 40 t. i. d., which was increased to grs. 90 t. i. d. This he took for about a month and seemed to improve on it. He was not iodized by it, but, finally, it upset his stomach. A little later he took arsenious acid, gr. $\frac{1}{60}$ t. i. d., increased in two months' time to gr. $\frac{1}{24}$ t. i. d. without any good effect. During these three months of treatment his stools were always white. He then took quinia sulph., pil. hydrarg., āā gr. j t. i. d., which caused his stools to change to a light brown color. Still later he took a pill of ox-gall, mercury, and quinine and then stopped taking medicine. From the commencement of treatment, in August, the liver steadily decreased in size.

The disease reached its height toward the end of 1884, and remained stationary throughout 1885, the swelling of the face showing slight variations at times. In the spring of 1886 he commenced to improve, and since that time he has been slowly improving in all respects. The face is much less swollen than it was, and the swelling of the legs and feet has disappeared entirely. The skin is less yellow than it was in 1885, and the spot of chloasma on the right side of the face has nearly disappeared. His skin is less scaly, and he sometimes perspires now, although for a long time he did not perspire at all. He is not quite so badly affected by the cold as he used to be, and this winter he has remained North, although every previous winter he has gone to the Southwest with the advent of cold weather. He is physically stronger, his mind is brighter, and he answers questions more promptly.

At the present time there is a slight yellow tinge to the skin generally, which is especially marked over face and vertex of head. The skin is scaly, the complexion is waxy, and on friction spots of congestion appear on the cheeks and persist a long time. The whole top of the head appears bald, but on close inspection is found covered with short, brittle stumps of hairs. Eyebrows, moustache, beard, hair on body fairly well developed; the hair being especially abundant on the front of the chest. The nails are ridged, and he says they are extremely brittle, and on that account trouble him greatly. The face is swollen, and pits only on long-continued pressure. The swelling affects especially the lips, which are much everted, and of a bluish color, the nose and cheeks are also swollen, and, to a less degree, the forehead; the under eyelids are baggy and wrinkled, but the swelling is much less than it was a year ago. The tongue and soft palate, and, to a less degree, the hard palate, are anæmic and much swollen. The mucous membrane covering the epiglottis, the arytenoid cartilages, and the false and true vocal cords is anæmic and swollen. The epiglottis and vocal cords are less swollen than the other parts, and present a slight, but evident, yellow tinge, and the vocal cords do not meet perfectly in phonation, but leave a slight oval between them near their centre. The two cords move symmetrically. No thyroid gland can be felt, and there is no history of any goitre. The trachea is not particularly movable nor compressible. There is a slight fulness above each clavicle, but no fatty tumor in that region. The patient is weak. No disturbance of tactile, painful, or thermic sensibility. Plantar reflex absent on both sides. Knee-jerk normal on both sides. Thoracic and abdominal examination negative. Urine presents a normal appearance, no sediment, sp. gr. 1030, and contains neither albumen nor sugar. An examination of the blood shows that there are 4,001,000 corpuscles to the cubic millimetre, that the corpuscles are of normal appearance, and that the ratio of the white to the red corpuscles is not materially altered. A sphygmographic tracing of the pulse is shown in Fig. 12.

FIG. 12.



ELECTRICAL EXAMINATION.—The indifferent electrode on nape of neck:

Faradic current. All nerves and muscles respond with tube fully in, the muscles of the right side contracting more strongly than those of the left.

Galvanic current. Milliampères (Hirschberg galvanometer).[1]

	Right.	Left.
Facial nerve trunk.	KaS 2 AnS 3 AnO 4.	KaS 2½ AnS 3½ AnO 4½.
Frontal muscle.	KaS 1½ AnS 2 AnO absent.	KaS 1 AnS 1½ AnO absent.
Zygomatic muscle.	KaS 1½ AnS 2 AnO absent.	KaS 2½ AnS 3 AnO absent.

The muscles respond with a quick contraction to each kind of electricity.

An examination of the eyes by Dr. Merrill shows vision: Right $\frac{20}{\text{XL}}$, with correcting cylinders vision is $\frac{20}{\text{XXX}}$. Left $\frac{20}{\text{XL}}$, with correcting cylinders vision is $\frac{20}{\text{XXX}}$.

In 1877 the patient consulted Dr. Merrill on account of blepharitis and asthenopia, which were found to be due to astigmatism, and were corrected by proper cylinders. This refraction is the same now as then, although the vision has failed somewhat. It was then, without glasses, $\frac{20}{\text{XXX}}$ in each eye; and with proper glasses $\frac{20}{\text{XX}}$. On ophthalmoscopic examination nothing abnormal was noted, except a haziness extending throughout the entire extent of both retinæ. The fields of vision show a marked concentric limitation, almost as great as in the case of Mrs. B., Fig. 5.

Patient states that he has been constipated throughout his sickness. He has noticed no alteration in the secretion of his eyes, nose, or mouth. He now weighs 145 pounds, and never weighed more than 155 pounds. He eats very little meat, and takes but little food of any kind. Pulse is 70 after walking. He sleeps well. His arms and legs used to be constantly going to sleep, and even at the present time the region of the distribution of the right ulnar nerve becomes numb, and goes to sleep every night.

April 2, 1888. During the past year the patient has continued to improve slightly.

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[1] The Gaiffe galvanometer used in the two former cases has been recently tested and found to be accurate. When the Gaiffe and Hirschberg galvanometers are compared with each other, the former registers twice as high as the latter; so that the numbers given in the third and fourth cases are probably only one-half what they should be.

The following case was kindly referred to me by Dr. McLean, of Troy:

CASE IV.—*January 30, 1887.* Mr. S., æt. twenty-seven, unmarried. His mother is healthy; she had eight children; two died in infancy, and six are living. His father has not been able to work for several years on account of disease of the kidneys. His oldest sister has heart disease; another sister has Bright's disease, and his two other sisters are affected somewhat as he is. He has always been weak, and could not play as vigorously as other boys. When fourteen years old he had two slight attacks of jaundice. His present sickness commenced when he was eighteen years old, but exactly how, he cannot remember. He grew steadily worse, till two years ago, since which time he has improved a little. His sister says that up to the age of eighteen years his skin was remarkably soft and white.

Patient now complains that he is so weak that he can walk only a short distance. He is much troubled by dizziness and by pain in the back. His feet and hands are cold and numb, and he cannot bear cold weather. He always feels worse in hot weather, and he becomes much bloated. At such times he cannot see his knuckles, and the wrinkles disappear from the skin. When it is alternately hot and cold, the skin becomes much wrinkled and cracked. At one time he had an abundant crop of hair on his head, but now it has mostly fallen out, as has also the hair on his body. He has a great deal of watery discharge from the nose, a superabundance of saliva, and he also cries easily, having an abundance of tears. The saliva seems to come especially from the right side of his mouth, and his right nostril discharges much more freely than the left, but he notices no such difference between his eyes. He is subject to hemorrhages, and has had some severe hemorrhages from the nose, from the gums, and from the bladder. Almost every night there is a discharge of watery blood from his mouth. His hearing is good, but his sight is dim. His memory is poor; he is not troubled by headaches, and never had any delusions, nor anything resembling insanity. He sleeps poorly, and is much disturbed by vivid dreams of an unpleasant character. No thoracic symptoms, except slight palpitation. Appetite good; some distress after eating; bowels rather costive.

His appearance is dull and stupid. His speech is slow, hoarse, and monotonous. The skin has a yellow tinge, and is swollen and wrinkled. It does not pit except slightly after long continued and deep pressure. The eyelids are baggy, wrinkled, and translucent; there is a ridge above the eyebrows; the naso-labial fold is continued up over the nose by a band of thickened skin above it: the lips are swollen and everted. The tongue is much swollen, as is also the mucous membrane of the pharynx to a less extent. The mucous membrane of the larynx appears only slightly swollen, and the vocal cords are thickened, and not entirely approximated in phonation. The entire mucous membrane is anæmic. The skin of the body is covered with thick yellow scales. These scales can for the most part be removed by hard and continuous rubbing, but they quickly form again. They are on the face and scalp as well as on the body, arms, and legs, and are especially thick and rough on the feet and on posterior aspect of elbows. The hair of the head is extremely thin; the hairs are not broken off, but each hair is separated from its neighbors by a large space. There are no hairs on his body, nor in the axillæ, and only a few hairs on chin and pubes. Plate II., Fig. 2, and Plate III.,

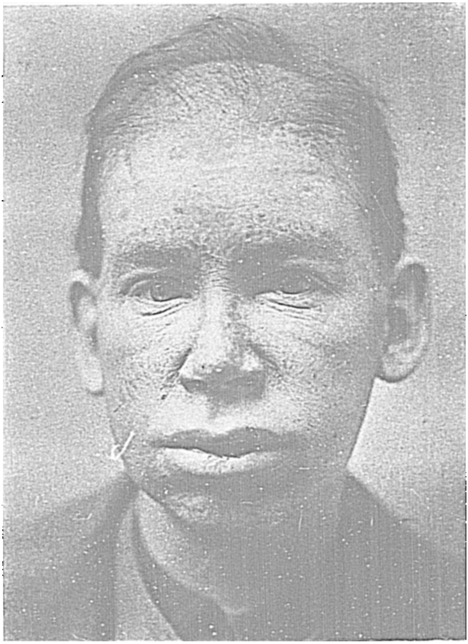


Plate II., Fig 2.
Photograph of Mr. S. (Case IV.)
which was taken recently.

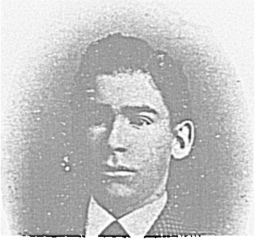


Plate II., Fig. 1.

Photograph of Mr. S. (Case IV.) which was taken when the disease was commencing.

To face page 22.]

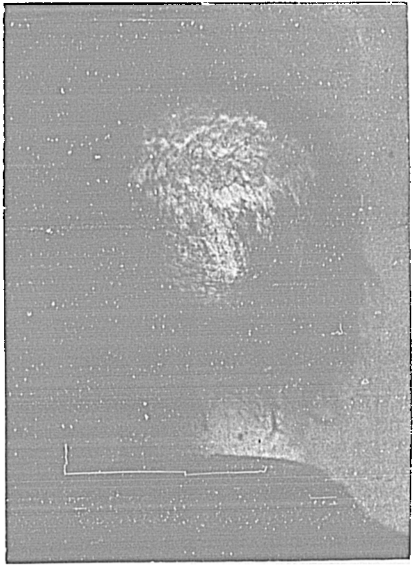


Plate III., Fig. 1.

Photograph of back of head of Mr. S. (Case IV.)

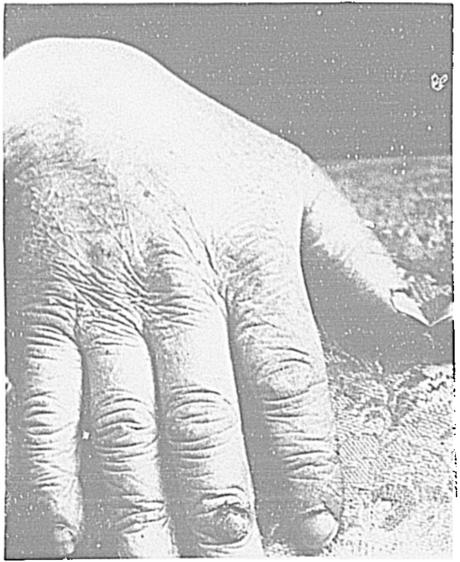
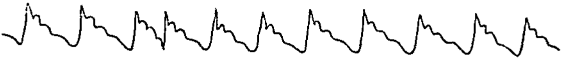


Plate III., Fig. 2.

Photograph of hand of Mr. S. (Case IV.)

Figs. 1 and 2, show the present condition of his face, hands, and back of head. Plate II., Fig. 1, is from a photograph taken when he was about twenty years old, when the disease was commencing. Abdomen is distended, and rather pendulous, otherwise abdominal and thoracic examination is negative. He passes a large amount of urine which contains a trace of albumen but no casts. An examination of the blood shows 3,004,000 corpuscles in a cubic millimetre; the form of the corpuscles and the ratio of the red to the white not being materially altered. Pulse slow. Fig. 13 is a sphymographic tracing of the pulse. All the patient's movements are sluggish and weak. No disturbance of tactile, painful, nor thermic sensibility. Plantar reflex absent or greatly diminished. Knee-jerk faint. An examination of the eyes by Dr. Merrill shows vision: Right $\frac{20}{\mathrm{L}}$, Left $\frac{20}{\mathrm{XL}}$, not improved by glasses in either case. The ophthalmoscopic examination was entirely negative. The fields of vision showed a slight concentric limitation.

FIG. 13.



ELECTRICAL EXAMINATION.—Indifferent pole on nape of neck.

Faradic current.	Left.	Right.
Facial nerve trunk.	Tube fully in,	Tube withdrawn 1½ inches.
Frontal muscle.	Tube withdrawn 1¼ inches.	" " 1½ "
Zygomatic muscle.	" " ¾ inch	" " 1⅛ "

Galvanic current [Milliampères]. (Hirschberg galvanometer).[1]	Left.	Right.
Facial nerve trunk.	KaS 2 AnS 3 AnO absent.	KaS 2 AnS 3½ AnO absent.
Frontal muscle.	KaS 1 AnS 2¾ AnO "	KaS 1¾ AnS 2¼ AnO "
Zygomatic muscle.	KaS 2 AnS 3 AnO "	KaS 2½ AnS 3½ AnO "

April 1. Patient took nitroglycerine, gr. $\frac{1}{50}$th t. i. d., for a long time without any benefit, and then Fellows's compound syrup of the hypophosphites, with no better success. A single dose of pilocarpine, gr. $\frac{1}{60}$th, caused obstinate vomiting and great prostration, without producing any sweating.

March 25, 1888. He has not changed materially during the past year, although he feels better, and the skin of the legs and feet is less swollen and scaly than it was. He has been somewhat less troubled by bloody saliva, but lately he has had frequent and severe nasal hemorrhages. Three years ago he had repeated discharges of bloody urine. Is very dizzy, and is so weak that he cannot go up stairs without the aid of his hands. There is no impairment of tactile or painful sensibility. No retardation of conduction of sensory impulses. Plantar reflex and knee-jerk normal. Gums extremely swollen and spongy and bleed easily. Teeth are badly formed and loose, and occasionally one falls out. He says that the teeth get loose and then get tight again. Temperature in rectum 98.2°; in mouth 97.7°; in right axilla 97.2°; in left axilla 96.8° (same thermometer). A surface thermometer held with moderate pressure on forehead registered 94°, but the reading varied with the pressure from 92° to 98°. Urine, sp. gr. 1020, clear yellow, contains one-eighth per cent. of albumen, no sugar. Sediment contained no casts, but a large number of red blood globules. His nose continues to run a great deal; whenever he bends his head forward drop after drop of clear fluid falls slowly from the nose.

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[1] See foot-note to Case III.

An elder sister of Mr. S., twenty-nine years old, has apparently recovered from a mild attack of myxœdema. She says that her skin has always been rough, especially across the small of her back and on the inner side of her thighs and legs. At times her face is swollen, especially under her eyes. She does not mind the cold weather, but dreads the hot weather, because she becomes so hot and flushed. She does not perspire even in summer, unless she works hard, and when she perspires her skin is softer. Two years ago she had an attack of jaundice, lasting four or five months, and was confined to her bed most of that time, and her hair fell out freely, and her teeth became loose. Since that time her skin has been decidedly less rough. She frequently has a tired feeling come over her, which compels her to lie down. She cannot work in a factory because she gets so hot and flushed. She has never had a goitre nor has any member of her family. She used to have, as a girl, frequent and severe epistaxis, and she has always been unwell very freely, much more than she thinks is natural. Her memory is good. She has vivid dreams. She has a good crop of hair except in axillæ, where she never had hair. Her teeth are not decayed. Her voice is not hoarse. Temperature in mouth at 8 P.M. 99.2° Her appearance is not abnormal, except for some thickness of the lips and puffiness about the eyes, and a slight scaliness of the skin, especially on inner side of thighs. She says that she is very much better than she was, and she attributes her improvement to daily warm baths and excessive friction of the skin, which she has used with great energy for several years.

A younger sister of Mr. S., twenty years old, seems to be in the early stages of a mild form of myxœdema. Her face has always been swollen and her skin is thick and scaly. Hair of head has always been thin, and has not grown much until recently. There is no hair in axillæ, but the hair on the pubes is well developed. Her nails are not brittle but are not well formed. No trouble with her teeth. She always has been badly affected by the hot weather, she becomes hot and flushed and perspires only slightly. During the past winter she was much troubled by chilblains on her feet, and her hands were deeply chapped and fissured, although she went out very little. Her voice is clear. She feels weak and languid. She has neither epistaxis nor menorrhagia. Pulse 80, small; temperature at 8 P.M. 100°; urine sp. gr. 1005, trace of albumen, the sediment contains no casts, but much vesical epithelium. She complains especially of flushing and burning of face, which looks flushed and swollen.